UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,132	04/11/2001	Juin-Hwey Chen	1875.0250002	1571

26111	7590	06/18/2004	

STERNE, KESSLER, GOLDSTEIN & FOX PLLC
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER
LEWIS, MICHAEL A

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 06/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 47* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1- 47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>02- 05</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1.   Claims 11,14,17,19,28,39,44 & 46 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regards to claims 11,14 & 39, the claim language that refers to the filtering in step (c)(i) is based on an initially zeroed filter state, and wherein step (c) further comprises the step of: (c)(iii) zeroing the filter state to produce the initially zeroed filter state before each pass through step (c)(i) is not taught in prior art. Sugihara (US5493296) teaches that the detecting means where the signal value fed back to the quantizer is set to zero when the detection means detect that the number of bits of the input signal is less than that of the output signal (Col 2, Lines 12 – 19).

In regards to claims 19 & 46, the combination of Marcellin et al. and Watts et al. disclose the speech signal comprises a sequence of speech vectors each including a plurality of speech samples, the method further comprising the steps of: deriving a gain value based on the speech signal once every M speech vectors, where M is greater than one; scaling the N VQ codevectors the once every M speech vectors based on the gain value; and deriving the N error vectors in step (c) only when the gain value is derived the once every M speech vectors, whereby a same set of N

error vectors is used in selecting each of M preferred codevectors in step

(d) corresponding to the M speech vectors.

In regards to claims 17 & 44, the combination of Marcelllin and Watts et al.

do not teach the speech signal comprises a sequence of speech vectors

each including a plurality of speech samples, the method further

comprising the steps of: deriving a set of filter parameters based on the

speech signal once every T speech vectors, where T is greater than one;

and performing step (c) only when a set of filter parameters is derived the

once every T speech vectors, whereby a same set of N error vectors is

used in selecting each of T preferred codevectors in step (d)

corresponding to the T speech vectors.

In regards to claim 28, the claim language that refers the step (d)

comprises solving the equation below for $y.sub.j$ 36 [n N j g 2 (n) H T (n

) H (n)] y j = [n N j g (n) H T (n) qzi (n)] ,where $y.sub.j$ represents an

updated codevector resulting from updating the one of the N codevectors

to minimize the total quantization error energy, $g(n)$ represents a

codevector scaling factor, $H(n)$ represents a codevector filter transfer

function, and $qzi(n)$ represents a ZERO-INPUT response could not be

identified in the prior art.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

3.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1,

148 USPQ 459 (1966), that are applied for establishing a background for

determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1.   Determining the scope and contents of the prior art.
    2.   Ascertaining the differences between the prior art and the claims at
            issue.
    3.   Resolving the level of ordinary skill in the pertinent art.
    4.   Considering objective evidence present in the application indicating
            obviousness or nonobviousness.

1.   Claims 1 – 10, 12 -13,15 –17,18, 20 – 27, 29-38 & 40-43, 45 & 47 are

rejected under 35 U.S.C. 103(a) as being unpatentable over Marcellin et al

(Advances in Speech Coding; Pub. Kluwer Academic Publishers, March 5, 1992)

and view of Watts et al (IEEE CH2535-3/88/0000-0275).

    In regards to claims 1 & 29, Marcellin et al. disclose a Noise Feedback

    Coding (NFC) system, a method of efficiently searching N predetermined

    Vector Quantization (VQ) codevectors for a preferred one of the N VQ

codevectors to be used in coding a speech or audio signal (Fig 1),
comprising the steps of: (a) predicting the speech signal to derive a
residual signal (Page 48, Paragraph 3); (b) deriving a response error
vector common to each of the N VQ codevectors (Page 48, Paragraph 3 –
Page 49, Paragraph 2); (c) deriving N response error vectors each based
on a corresponding one of the N VQ codevectors (Page 50, Paraghaphs 1
– 2); and (d) selecting the preferred one of the N VQ codevectors as the
VQ output vector corresponding to the residual signal based on the
response error vector and the N response error vectors (Page 50,
Paragraph 2 – Page 51 – Paragraph 1; Eqn 10). Marcellin et al. do not
disclose language that explicitly deals with ZERO-INPUT or ZERO-STATE
Response VQ Codevectors. However, Watts et al. teaches ZERO-INPUT
Response and ZERO-STATE Response in relation to VQ codevectors.
The ZERO-STATE and ZERO-INPUT Response vectors are used in noise
feedback coding systems to reduce the complexity of the system while
delivering the same output performance.

Therefore, it would have been obvious to one of ordinary skill at the time
of the invention to modify Marcellin et al. with the use of ZERO-INPUT and
ZERO-STATE response/vectors as taught by Watts et al. since it would
have decreased the complexity of the system while maintaining the
accuracy.

In regards to claims 2 & 30, Marcellin et al. disclose the step of: separately combining the response error vector with each one of the N response error vectors to produce an error energy value corresponding to each one of the N VQ codevectors, wherein step (d) comprises selecting one of the N VQ codevectors corresponding to a minimum error energy value as the preferred one of the N VQ codevectors (Page 49, Paragraph 1). *[Marcellin describes a relationship for the noise feedback filter where a factor μ is chosen with the goal of suppressing the noise spectrum in frequency bands where the input speech has low energy content, thereby decreasing or minimizing the audibility of the reconstruction noise. The noise spectrum is used to calculate the VQ error energy values].*

In regards to claims 3 & 31, Marcellin et al. disclose the step (b) comprises the steps of: (b)(i) deriving an intermediate vector based on the residual signal (Page 49, Paragraph 2); (b)(ii) predicting the intermediate vector to produce a predicted intermediate vector (Page 49, Paragraph 2); (b)(iii) combining the intermediate vector with the predicted intermediate vector and a noise feedback vector to produce the response error vector (Eqn. 7 – 10); and (b)(iv) filtering the response error vector to produce the noise feedback vector (Eqn. 4).

In regards to claim 4 & 32, Marcellin et al. disclose the step (b)(ii) comprises long-term predicting the intermediate vector to produce the predicted intermediate vector (Fig 1(P_L)); and step (b)(iv) comprises long-term filtering the response error vector to produce the noise feedback vector (Page 49, Paragraph 2).

In regards to claims 5 & 33, Marcellin et al. disclose step (b)(ii) comprises predicting the intermediate vector based on an initial predictor state corresponding to a previous preferred codevector (Eqn 6); and step (b)(iv) comprises filtering the response error vector based on an initial filter state corresponding to the previous preferred codevector (Eqn. 7 – 9).

In regards to claims 6 & 34, Marcellin et al. disclose the step (b) comprises the steps of: (b)(i) combining the residual signal with a noise feedback signal to produce an intermediate vector (Fig. 1, Page 48); (b)(ii) predicting the intermediate vector to produce a predicted intermediate vector (Page 48, Paragraph 3 – Page 49, Paragraph 1); (b)(iii) combining the intermediate vector with the predicted intermediate vector to produce an error vector (Fig 1(r_i)) *[The residual is the error signal that is the difference between the actual speech signal and the modeled/filtered version of the speech signal]*; and (b)(iv) filtering the error vector to produce the noise feedback vector(Page 49, Eqn 4).

In regards to claims 7 & 35, Marcellin et al. disclose step (b)(ii) comprises long-term predicting the intermediate vector to produce the predicted intermediate vector; and step (b)(iv) comprises short-term filtering the error vector to produce the noise feedback vector (Pages 48 – 49).

In regards to claims 8 & 36, Marcellin et al. disclose step (b)(ii) comprises predicting the intermediate vector based on an initial predictor state corresponding to a previous preferred codevector (Fig 1;Eqn 3); and step (b)(iv) comprises filtering the error vector based on an initial filter state corresponding to the previous preferred codevector (Eqn 3).

In regards to claims 9 & 37, Marcellin et al. disclose the step (c) comprises the steps of: (c)(i) separately filtering an error vector associated with each of the N VQ codevectors to produce a input vector corresponding to each of the N VQ codevectors (Page 49, Paragraph 1); and (c)(ii) separately combining each input vector from step (c)(i) with the corresponding one of the N VQ codevectors, to produce the N error vectors (Page 49, Paragraph 2).

In regards to claims 10 & 38, Marcellin et al. disclose the filtering in step (c)(i) comprises short-term filtering of the error vector (Fig 1(P_s)).

In regards to claims 12 & 40, Marcellin et al. disclose the step (c) comprises the steps of: (c)(i) separately combining each of the N VQ codevectors with a corresponding one of N filtered, error vectors to produce the error vectors; and (c)(ii) separately filtering each of the N error vectors to produce the N filtered, error vectors (Eqn. 5 – 10).

In regards to claims 13 & 41, Marcellin et al. disclose the filtering in step (c)(ii) comprises short-term filtering (Fig 1(Ps)).

In regards to claims 15 & 42, Marcellin et al. do not disclose the steps of: deriving a gain value based on the speech signal; and scaling at least some of the N VQ codevectors based on the gain value. However, Watts et al. teach a gain adaptive vector quantization based on fixed lognorm prediction. In addition, Watts teach scaling at least some of the N VQ codevectors based on the gain value (Watts, Fig. 1 (b – c)). The high gain scalar predictor helps to reduce the complexity while preserving the performance of the encoder.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify Marcellin et al. by deriving a gain value and scaling of the N VQ codevectors based on the gain value as taught by Watts et al. since it would have decreased the complexity of the system while preserving the quality of the encoding process.

In regards to claims 16 & 43, Marcellin et al. disclose the steps of: deriving

a set of filter parameters based on the speech signal; and filtering the N

VQ codevectors in step (c)(ii) based on the set of filter parameters (Eqn. 5

– 6).

In regards to claims 18 & 45, Marcellin et al. disclose the speech signal

comprises a sequence of speech vectors each including a plurality of

speech samples, the method further comprising the step of: performing

step (c) once every T speech vectors, where T is greater than one,

whereby a same set of N error vectors is used in selecting T preferred

codevectors in step (d) corresponding to the T speech vectors (Watts,

Page 9.2.1 - 9.2.2, Section 2).

In regards to claim 20, Marcellin et al. disclose a method of deriving a final

set of N codevectors useable for prediction residual quantization of a

speech or audio signal in a Noise Feedback Coding (NFC) system (Fig 1),

comprising the steps of: (a) deriving a sequence of residual signals

corresponding to a sequence of input speech training signals (Page 48,

Paragraph 3); (b) quantizing each of the residual signals into a

corresponding preferred codevector selected from an initial set of N

codevectors to minimize a quantization error associated with the preferred

codevector, thereby producing a sequence of preferred codevectors

corresponding to the sequence of residual signals(Page 48, Paragraph 3 –

Page 49, Paragraph 2); (c) deriving a total quantization error energy for

one of the N codevectors based on the quantization error associated with

each occurrence of the one of the N codevectors in the sequence of

preferred codevectors (Page 49, Paragraph 1). *[Marcellin describes a*

relationship for the noise feedback filter where a factor μ is chosen with

the goal of suppressing the noise spectrum in frequency bands where the

input speech has low energy content, thereby decreasing the audibility of

the reconstruction noise. The noise spectrum is used to calculate the VQ

error energy values]; and (d) updating the one of the N codevectors to

minimize the total quantization error energy (Fig 1).

In regards to claim 21, Marcellin et al. disclose further comprising the step

of: (e) repeating steps (c) and (d) for each of the codevectors in the set of

N codevectors, thereby updating each of the N codevectors to produce an

updated set of N codevectors (Fig 1).

In regards to claim 22, Marcellin et al. disclose the step of: (f) continuously

repeating steps (b)-(e) using each updated set of N codevectors as the

initial set of N codevectors in each next pass through steps (b)-(e), until

the final set of N codevectors is derived (Page 50).

In regards to claim 23, Marcellin et al. disclose step (f) comprises the

steps of: deriving a quantization error energy measure associated with each updated set of N codevectors from step (e)(Eqn 8); selecting an updated set of N codevectors from step (e) as the final set of N codevectors when an error energy difference between the quantization error energy measure associated with the final set of N codevectors, and the quantization error energy measure associated with a previously updated set of N codevectors is within a predetermined error energy range (Page 49, Paragraph 1, Page 50).

Regarding claims 24 & 25, the Marcellin disclose that the codevectors has a vector-dimension of one or more, whereby each of the codevectors represents a scalar quantity or vector quantity respectively(Page 50) *[Marcellin et al. describes scalar and vector quantization. It is inherent in the definition that a scalar quantity has a dimension of one and the vector quantization has a dimension greater than one]*

In regards to claim 26, Marcellin et al. disclose wherein step (b) comprises: (b)(i) deriving a ZERO-INPUT response error vector common to each of the N codevectors; (b)(ii) deriving N ZERO-STATE response error vectors each corresponding to one of the N codevectors (Page 48, Paragraph 3 – Page 49, Paragraph2); (b)(iii) separately combining the ZERO-INPUT response vector with each of the ZERO-INPUT response error vectors to produce N quantization error energy values each

corresponding to one of the N codevectors(Page 49, Paragraph 2); and

(b)(iv) selecting one of the N codevectors corresponding to a minimum

one of the N quantization error energy values as the preferred codevector

(Page 49, Paragraph 1).

In regards to claim 27, Marcellin et al. disclose step (b)(ii) comprises the

steps of: combining each of the N codevectors with a corresponding

feedback signal to produce the N ZERO-STATE response vectors (Eqn. 5

– 10); and separately short-term filtering each of the N ZERO-STATE

response vectors to produce each said corresponding feedback signal

(Fig 1(Ps)).

Conclusion

1.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Navarro et al.	U.S. Patent (5963898)
Gerson et al.	U.S. Patent (5675702)
Chen et al.	U.S. Patent (EP0573216A2)
Hayashi et al	Elsevier Science (1656-1684/99)

Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Michael A Lewis whose telephone number is

703 305-8730. The examiner can normally be reached on Monday through
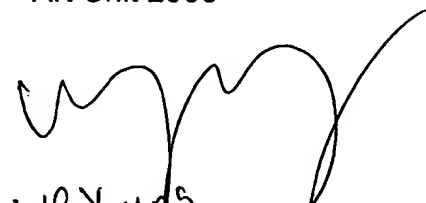
Friday, 8:30 am – 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Doris To can be reached on (703)305-4827. The fax

phone number for the organization where this application or proceeding is

assigned is 703-872-9306.

Information regarding the status of an application may be obtained from

the Patent Application Information Retrieval (PAIR) system. Status information

for published applications may be obtained from either Private PAIR or Public

PAIR. Status information for unpublished applications is available through

Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-

free).

Lewis A Michael
Examiner
Art Unit 2655

Mal

6/10/2004

WR You
Primary Examiner